

within him, appalled before the host of difficulties; as when, for example, the shadow of a passing cloud on a sunny day reveals to him the individuality of the 400 plants in each square foot of pasture, which have before escaped his attention, and the thought flashes across his bewildered mind of the 400 parts played by each plant, and the 400 times 400 causes that effect them. Almost hopelessly he perceives that the knowledge which he is in search of, and which he fancied he had in his hand, has eluded his grasp like a fire-fly, and left only a flash behind; and for a moment his mind is enveloped in darkness, overpowered by the infinity of Nature. The searcher after truth, however, recovers, recognizes his difficulties, recalls the object of his pursuit, returns to it with renewed energy, and, with unbiassed mind, records his observations day by day.

ALPINE HAZE.

THAT no letter has appeared on the common occurrence of this phenomenon in the British Isles is one of a thousand tokens of the small amount of interest in atmospheric phenomena taken by the public in this country. In bright days when the atmosphere at the earth's surface is nearly calm and moderately dry, the sky being nearly devoid of clouds, horizontal layers of buff-coloured haze may be frequently seen near the horizon in almost every locality in the British Isles where the air is free from the smoke of our large towns. I do not happen to have seen it nor have I heard of its occurrence on the west coasts of Scotland or of Norway. I have frequently noticed it when out of sight of land. It would be interesting to know whether it is seen at a distance of 400 or 500 miles from the nearest shore. At St. Aubin's, Jersey, at an elevation at which the French coast near St. Malo is rarely visible, a stria of this haze is often the accompaniment of mirage, the inverted image of the white-tipped rocks appearing to hang from the layer of haze, and the mirage disappearing with a change of the observer's elevation, but the line of haze remaining visible. The mirage was, when first seen, mistaken for a few minutes by some members of my family for a series of water-spouts.

I have long ago given the specific name of *nebula arida*, "dust-haze," to the phenomenon dealt with in this letter; and I still think that the English title "dust-haze" is preferable to "earth-haze," or any equivalent of the former to any of the latter in foreign languages, the latter term being too general, and capable of including the haze or mist produced by the presence of water particles. The word "dust" does not exclude organic matter, although ordinary dust-haze consists in most cases, as I think, of inorganic particles. On the other hand, any name which appears to localize the phenomenon is scarcely admissible. Dust-haze may be somewhat easily distinguished from ordinary mist or water-haze by its colour appearing of a reddish-buff tint in reflected light; and unless in complete shade from direct light, rarely becoming neutral; whereas mist usually appears gray, neutral, or bluish in reflected light, and yellow, orange, or red in transmitted. Patches—or, as they appear at a distance, bands—of dust-haze often become beds of the under surface of *cumuli*, to the formation of which clouds they then seem to bear a causal relation. As frequently in our islands, the haze is replaced during the night by stratiform clouds at its own level. In these cases there can be, I think, little doubt that the solid particles cause the precipitation of vapour. This fact somewhat militates against M. Antoine d'Abbadie's theory that the haze is really dry air, a supposition which for other reasons I regard as untenable.

Seen near the sun at sunset, bands of dust-haze are mistaken by many observers for threads of *cirrus* (what

I term *cirro-filum*), and moreover the two phenomena are not uncommonly seen at the same time. As observations at sunset are useful in forecasting weather, the observers should take care to remember that lines of *cirrus* are always more illuminated in transmitted light than any species either of haze or of stratus cloud; secondly, that the *cirrus* threads appear slightly arched when viewed across the line of sight, and radiating when more coincident with it; and lastly, that a slight curl here or there very often betrays the existence of the lofty ice-cloud. I have frequently given rough sketches of these latter sunsets to observers, and these have borne a singular likeness to Antoine d'Abbadie's sketch of the dust-haze itself (NATURE, November 22, p. 79). But I do not understand this sketch, or in what sense it represents two *horizontal* bands.

In conclusion, I may perhaps be permitted to refer to two phenomena slightly related to the subject of this letter. The first is smoke. This is much more "accumulated" or less amorphous than water-dust, although its optical characteristics resemble somewhat closely those of water-dust. On the other hand, it is much more amorphous than dust-haze; and even the line left in the atmosphere by a steamer on the sea horizon on a calm day will scarcely be mistaken for dust-haze. Smoke when at a considerable elevation undoubtedly produces *cumuli* under favourable conditions. A string of ill-defined *cumuli* may be seen in the smoke of a burning forest or heath when carried a long way from land by a wind from the shore. This condensation is probably principally caused by the presence of solid particles, as in the case of dust-haze, but it may be borne in mind that a large quantity of vapour is carried up with smoke.

Lastly, the keen eye will soon learn to distinguish a peculiar haze often noticeable in England, especially over the wheat-producing districts, in fair calm weather in the month of September. This haze is also visible in some, and probably in many, parts of continental Europe. It is caused by flying Aphides, ten or more of which may be often captured in a cubic yard of air at about 10 feet from the earth's surface. In reflected light the haze has a tint of tender ultra-marine ash.

W. CLEMENT LEY.

Lutterworth, December 8.

NOTES.

MR. RALPH COPELAND, Ph. Doc., F.R.A.S. has been appointed Astronomer Royal for Scotland, and Professor of Practical Astronomy in the University of Edinburgh, in the room of Prof. Piazz Smyth, resigned. Prof. Copeland has proved himself to be among the most skilful of modern observers.

M. DITTE has been elected to succeed the late Prof. Debray at the Sorbonne.

THE Paris Municipal Council will shortly be asked to grant the funds required by Prof. Giard to provide a laboratory and to secure the necessary assistants.

WE refer elsewhere to-day to the dinner given on Tuesday, the 11th inst., at Christ's College, Cambridge, to celebrate the completion of the ninth edition of the "Encyclopedia Britannica." The chair was of course occupied by Dr. Robertson Smith, the editor. Among the scientific contributors present were Sir Frederick Abel, Dr. Affleck, Sir Nathaniel Barnaby, Dr. Buchan, Prof. Cayley, Prof. Darwin, Mr. F. Darwin, Prof. Dittmar, Prof. Michael Foster, Dr. A. Geikie, of the Geological Survey, Dr. Glaisher, Sir F. Goldsmid, Prof. Cleland, Prof. Marshall Ward, Dr. Creighton, Prof. Greenhill, Dr. Günther, Sir Charles Hartley, Baron von Hügel, Prof. Keane,

Mr. Keltie, Prof. Ray Lankester, Mr. Norman Lockyer, Prof. MacAlister, Col. Maurice, Captain Moriarty, Dr. John Murray, of the *Challenger* Commission, Prof. Newton, Prof. Roberts-Austen, Prof. Vines, General Walker. At the close of the banquet the Chairman read letters which had been received from scholars and men of science at home and abroad. In asking the company to pledge each other in good fellowship in the loving cup, he said he could not deny himself the pleasure of saying with how much cordiality and heartfelt gratitude he and his fellow-editor, Mr. J. S. Black, and the publishers greeted the contributors, who, by their hearty assistance and their constant readiness to do far more than one had a right to expect from contributors, had made it possible for them to carry to its completion a work the difficulties of which could not be appreciated other than by those who had to edit it. Having explained the difficulty of recognizing in one toast more than a thousand English and foreign scholars, of whom not more than one-tenth were present, Dr. Robertson Smith said he would follow the example of the title-page of the "Encyclopædia Britannica" and propose three toasts—Literature, Science, and Art. In submitting the first of these toasts, he referred to the great judgment and skill of his predecessor, Prof. Spencer Baynes. Dr. Garnett responded for Literature, Dr. A. Geikie for Science, and M. Yriarte for Art. Prof. Michael Foster, amid cheers, gave "The Health of the Editor." With regard to the first editor, they would all agree with him that the qualities which Prof. Baynes had for carrying on this great work were in a certain way unexampled. His great knowledge of men and things and the fascinating way in which he made one contribute an article were beyond compare. Concerning the present editor he would prefer to fall back upon the letter received from Prof. Huxley, in which he said:—"The influence for good of the spirit of sound criticism which permeates all the theological articles cannot be over-estimated; and in all other respects, so far as I can judge, the work is wonderfully well carried out." The toast was drunk with musical honours. Dr. Robertson Smith said it was hardly possible for him to thank them sufficiently for the way in which they had drunk his health. He would repeat how very much he had felt the constant kindness and support of all his contributors, without which a work of the kind was impossible. He feared that the editor must sometimes be more or less exacting in such cases. It certainly pained him more to be so than, according to his experience, it pained the contributor to meet the wishes that he expressed. Although all good English work had been due to the spirit of accommodation and of friendly help that pervaded our national life, from his own experience he did not think that any monument of English work had shown more of this good quality, which characterized literary men of every nationality, than had the "Encyclopædia Britannica." Prof. Newton proposed "The Publishers," and Mr. Adam W. Black responded. Mr. Sutherland Black gave "The Health of the Provost and Fellows of Christ's College," and with the reply of Dr. Peile the proceedings closed.

THE year 1889 being the fiftieth anniversary of the Royal Botanic Society, it is proposed that the occasion shall be celebrated by a special *fête*. An announcement on the subject will be made in due course.

PROF. JUDD informs us that he has communicated to the Geological Society a paper on the Tertiary volcanoes of the Highlands, dealing with some of the questions referred to in the article on this subject which appeared in NATURE two weeks ago.

ABOUT four years ago King Oscar of Sweden and Norway offered a prize, consisting of a gold medal valued at 1000 francs, and 2500 kr. (£140) in money, for any one great discovery within the sphere of higher mathematical analysis. The prize is

to be awarded on His Majesty's sixtieth birthday, on January 21, 1889. Twelve papers have been sent in, seven of which are in French, four in German, and one in Italian.

VESUVIUS has lately been very active. It has been rapidly throwing up a new cone of eruption about 30 to 40 yards to the south-west of the original one, and the fissure across the crater plane towards the west-south-west is increasing in size and is richer in acid emanations. It is possible, therefore, that an eruption may take place soon on that side of the cone, since the vent tends to shift along the fissure pointing in that direction.

A SEVERE earthquake occurred in the Drant Valley on December 3 at 1.40 a.m. The shocks were from east to west, and were accompanied by subterranean noises.

IN addition to Prof. Milne's paper on the effects of earthquakes on the lower animals, to which we have already referred in these columns, the last number (vol. xii.) of the Transactions of the Seismological Society of Japan contains several other papers of interest, some of which, however, were noticed at the time they were read before the Society. Amongst other papers by Prof. Milne are: modern forms of pendulum seismometers; the Gray-Milne seismograph and other instruments in the Seismological Laboratory at the Imperial College of Engineering, Tokio; and on certain seismic phenomena demanding solution. A few of these latter are: sound-phenomena at the extremities of earthquakes; in soft ground the large horizontal motions are preceded by a series of vertical surface ripples; near to an origin the amplitude of normal motion is greater than the amplitude of transverse motion, but as the disturbance radiates they rapidly approximate to each other. Mr. W. G. Aston writes on earthquakes in Corea, giving a list of earthquakes prepared from the standard histories of that country, the "Tongkuk thong-kam" and the "Kuk-cho pong-kam," and showing that there were not more than twenty-seven earthquakes in all in that country in 1800 years. We observe also that the issue in Japanese of the Transactions of the Society is proceeding apace, and has now reached the fifth volume. This particular volume contains translations into Japanese of the following papers: earthquake effects, emotional and moral, by Prof. Milne; a model showing the motion of an earthquake particle during an earthquake, by S. Sekiya; earthquake frequency, by Dr. C. G. Knott.

ACCORDING to a private letter written by a resident at Godthaab, and sent to Denmark by the steamer *Fox*, Nansen encountered nothing but land covered with ice and snow in the interior of Greenland. The members of the Expedition, the writer says, were often able to "sail" along the smooth snowy surface on the *ski*. *Apropos* of the return of the Expedition, the first vessel leaving for Greenland next spring is the steamer *Hvielhjörnen*, belonging to the Greenland Company of Commerce. It departs late in March, so that the Expedition is due in Copenhagen at the end of May. A national subscription is now being raised in Norway to defray the cost of the Expedition, estimated at about £1000, part of this sum only having been as yet contributed. Some sort of national recognition of Dr. Nansen's achievements is also contemplated.

ON November 27, about 9 p.m., a brilliant meteor was seen at Christiansand, in Norway. It went from east to west in the southern sky, emitting a bright white light, finally bursting without any report.

FOGS of great density have prevailed recently in London, and have frequently spread over almost the whole of Great Britain and France. "It will probably not have escaped notice by those residing in the suburbs," says the *Times*, "that on many occasions lately, while the fog has lasted, moisture has poured down from the leafless branches of the trees as though they had

been exposed to a fall of rain, and the various hygrometers have shown the air to be completely saturated with moisture. Under such circumstances the fogs in London are always less injurious to life than those of a drier nature, and it will be observed that we have had no reports this year of cattle being suffocated at the Cattle Show by London fog, as they were a few years ago. What the difference may be between the two conditions would be an interesting subject for inquiry. On both occasions the fogs were anticyclonic, and it cannot be said that the number of fires in London has decreased during the past ten years."

THE Report on the Administration of the Meteorological Department of the Government of India in 1887-88, which has just been published, is divided into two parts. The first deals with the more important administrative questions that have arisen during the year; the second describes the actual working of the Department, and the condition of the observatories; it contains also extracts from the reports of the inspection of the stations. These reports show that in many cases the paid observers take but little interest in their work. Mr. Eliot has introduced various changes, among the chief of which are: (1) the discontinuance of solar and terrestrial radiation observations, except at a few selected stations, on the ground that these observations are open to various objections, and that the instruments are unsuited for exact measurement,—two instruments, apparently identical in construction, frequently giving different readings under the same circumstances; (2) the tabulation of all observations in a form admitting of easy reference, and of the calculation of daily averages,—at present, although the monthly means have been obtained, the average conditions of each day or week are not yet known; (3) the extension and improvement of the methods of collecting rainfall statistics. Rainfall is registered at all the meteorological stations, but each province has established its own method of taking the observations, the result being an utter want of uniformity in the hours of measurement, the times varying from sunrise to midnight. An observatory has been opened at Bagdad; and the question of the establishment of one at Perim, at the entrance of the Red Sea, is under consideration, at the suggestion of the English Meteorological Council.

ON November 1, a bird very rare in Europe was shot in the Island of Møen, in Denmark, viz. a specimen of the "isabel-coloured runner" (*Cursorius isabellinus*). The home of this bird is the Desert of Sahara. Only one or two specimens have hitherto been seen in Europe.

WE notice in the *Izvestia* of the East Siberian branch of the Russian Geographical Society, a very interesting paper by M. Khangaloff, on the customs of the Buriates some three or four centuries ago, when they did not yet carry on agriculture, and lived only by hunting and cattle-breeding. The author's attention has been devoted chiefly to the *zagheteaba*, i.e. the periodical hunting by whole tribes gathering together from places as distant from one another as Verkholsensk, Tunea, and Transbaikalia. Several hundreds, and sometimes thousands, of men gathered for these communal huntings, which lasted for forty days, and the author gives interesting details as to the customs in use on such occasions. They are still maintained, although only few tribes come together, and in order to keep up the old associations, fines have been imposed on those who do not assist at the huntings. Several "gentes" take part in the communal huntings, and must send one man out of each ten men of each "gens." The poor are freed from the obligation. The cleverness of the Buriates in killing wolves with their arrows, while riding at full speed, is really astonishing. The best archers kill a wolf at a distance of 100 yards.

THE Superintendent of the Anting Missionary Hospital, in a report on that institution, says that the Chinese believe that various animals, principally the hedgehog, weasel, fox, snake,

and rat, take up their abode in man and control his fortunes. The reason given by the Chinese for the selection of these animals is that they have discovered the secret of long life possessing which every other good thing is certain to follow. One patient insists that a man inside him holds interminable conversations with him. A strong cathartic removes this delusion for a few days, but the intruder is certain to return at the end of that time. With regard to the insane in China, they have a pitiable lot there. A plea of insanity is of no avail in a trial for murder, and the culprit is decapitated just as if he were sane. Usually, however, insanity takes a very harmless shape: holding conversations with imaginary persons is the commonest form; refusing to eat or drink, and insisting on sitting continually in one place, are also common.

A REPORT from Hirschberg states that while a reservoir was being made a subterranean river was lately discovered in the Riesengebirge. It is 2 metres below the surface of the earth. The river is said to be, at one spot, 150 metres broad.

PROF. KIKUCHI has published the geometry for Japanese students upon which, as we stated some few months since, he has been engaged. The English equivalent of the title-page is, "A Text-book of Elementary Geometry, vol. i., Plane Geometry, Books i., ii., iii. (corresponding to the Books i., ii., iii., of the Association Geometry)." The work is brought out by the Educational Department of Japan.

PROF. MATTHIAS DUVAL, of the Paris Medical Faculty, has just published a quarto atlas of embryology. It contains forty double plates, with over five hundred figures, concerning the embryological evolution of the chick.

A NEW alkaloid has been isolated from the poisonous plant *Fritillaria imperialis*, a member of the order Liliaceæ, by Dr. Fragner, of Prague. All parts of this plant, and particularly the bulbs, have long been known to be violently poisonous; the action of the poisonous principle being very similar to that contained in the *Scilla maritima*, which is so much used in medicine. In order to investigate the nature of this noxious substance, a large number of the crushed bulbs were triturated with lime, and the mixture evaporated to complete dryness upon a water-bath. The residue was then repeatedly treated with hot chloroform, and the solution so obtained agitated with water acidified with tartaric acid. On the addition of sodium carbonate to the concentrated solution, the alkaloid itself was obtained in the form of a voluminous yellow precipitate. After removal of the mother-liquor as completely as possible by means of the filter-pump, the substance was dissolved in hot alcohol. From this solution in alcohol the alkaloid crystallized in short needles, which, after several recrystallizations were obtained perfectly colourless. The crystals are very sparingly soluble in water, but readily in ether, chloroform, and alcohol, imparting to these liquids an extremely bitter taste. They melt at 254° C., and furnish, on analysis, numbers pointing to the formula $C_{35}H_{60}NO_4$. Dr. Fragner, in consideration of its source, has endowed the new alkaloid with the name "imperialine." On allowing a solution of imperialine in alcohol saturated with hydrochloric acid gas to stand for a short time, large translucent crystals of the hydrochloride, $C_{35}H_{60}NO_4HCl$, separate out; this salt is very soluble in alcohol or water, and these solutions also possess the bitter taste. On the addition of ether to a mixture of platinum or gold chloride and the alcoholic solution of the hydrochloride, a yellow oil is obtained which eventually becomes semi-solid. If this pasty substance be dissolved in hot dilute hydrochloric acid and allowed to stand, the platinum or gold salt is obtained, the former in orange and the latter in yellow-coloured crystals. The platinum salt, on analysis, was found to possess the composition $2C_{35}H_{60}NO_4HCl + PtCl_4$, and the gold salt gave numbers agreeing with the formula $C_{35}H_{60}NO_4HCl + AuCl_3$.

Thus the new alkaloid has been thoroughly investigated, and its composition determined with tolerable certainty. It is a significant sign of the progress of the times that these poisonous principles of the vegetable kingdom are being gradually isolated, and their nature determined. Of the wonderful processes by which they are built up within the vegetable cells, we are as yet almost completely in the dark, and can only hope for light and knowledge from the persevering attempts of chemists to understand their constitution and to synthesize them.

THE additions to the Zoological Society's Gardens during the past week include a Hawk-Owl (*Surnia funerea*) from Russian Finland, presented by Lord Lilford, F.Z.S.; a Nankeen Kestrel (*Tinnunculus cenchroides*) from Australia, presented by Mr. A. J. Wilkins; eight Wild Geese (*Anser cinereus*), a White-fronted Goose (*Anser albifrons*), a Herring Gull (*Larus argentatus*), British, presented by Mr. E. S. Cameron; two Galleated Pentonyces (*Pelomedusa guleata*), six Robben Island Snakes (*Coronella phocaenarum*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; three Black Tortoises (*Testudo carbonaria*) from South Brazil, presented by Mr. Leonard Cooper; five Moorish Geckos (*Tarentola mauritanica*) from the South of France, presented by Mr. J. C. Warburg; an Australian Cassowary (*Casuarus australis*) from Queensland, three Barbary Turtle Doves (*Turtur risorius*) from North Africa, a White Stork (*Ciconia alba*), European, deposited.

OUR ASTRONOMICAL COLUMN.

THE UNITED STATES NAVAL OBSERVATORY.—Captain R. L. Phythian, the Superintendent of the Naval Observatory, Washington, has just published his Report for the year ending June 30, 1888. The great 26 inch equatorial, which is in the charge of Prof. Asaph Hall, is in good order, and has been in constant use for micrometric measurement of the satellites of Saturn and Mars, and the regular list of double stars. The surfaces of both Saturn and Mars were constantly and carefully examined, and drawings made from time to time. In the case of the latter planet, the "canals" of Prof. Schiaparelli, though specially looked for, both during and after the opposition, could not be made out. The reduction and discussion of these observations are well advanced, in particular the computations with respect to the theory of Hyperion, which are now nearly ready for a complete discussion. The transit circle was dismounted and cleaned after April 4, 1888, and remounted in July, but notwithstanding this interruption 1970 observations were obtained with it from October 1, 1887, to October 14, 1888. The reductions are, however, in a backward state, the computing staff being too weak in number. The results for 1883 have been printed, and those for 1884 are in the press. The programme for future work includes the observation of the stars of the zones S. Decl. 14°-18° for the Astronomische Gesellschaft. The 9.6-inch equatorial has been chiefly used in the continued revision of Yarnall's Catalogue, and the observation of minor planets, comets, and of occultations.

The appendices to the Report contain the results of chronometer trials, and of the examination of sextants, binoculars, and other instruments, chiefly for naval use; the report of the Transit of Venus Commission, and that of Lieut. Winterhalter on his visit to Europe, in which he strongly urges the desirability of the Naval Observatory being empowered to join in the scheme of the Paris Astrophysical Congress of 1887 for charting the heavens by means of photography.

THE TOTAL SOLAR ECLIPSE OF JANUARY 1, 1889.—As the track of this eclipse passes through California, San Francisco, lying but a few miles south of the shadow line, it is probable that it will be watched by a number of persons who might make useful observations, and would gladly do so, if suitably directed. With a view of securing the services of such volunteers, and of employing them to the best advantage, Prof. Holden has published a little pamphlet containing "suggestions for observers." The two principal points on which he lays stress are the determination of the exact limits of the shadow, by noting the duration of totality at places just within it, and the photographing of the corona. The pamphlet is not in the least intended for trained astronomers, but will probably prove very useful for the

purpose for which it has been written. No English astronomers are going out to observe the eclipse, but, should the weather prove favourable, it will be well watched by American observers, for a strong party from Mount Hamilton itself are to occupy a station immediately on the central line, and Mr. Chas. Burkhalter, of Chabot Observatory, has organized a party of twenty amateur photographers for the purpose of obtaining pictures of the corona. Messrs. George and Thomas Davidson also, sons of Prof. Davidson, of the U.S. Coast Survey, will photograph the corona at the elevated station of Winnemucca, whilst five observers from the Harvard College Observatory, under the direction of Mr. W. H. Pickering, are to take up a very full programme of photographic, photometric, and spectroscopic observations. Mr. C. H. Rockwell, also, of Tarrytown, N.Y., who was one of the Caroline Island party in 1883, will observe the eclipse.

COMETS FAYE AND BARNARD, OCTOBER 30.—The following ephemerides for Berlin midnight are in continuation of those given in NATURE for 1888 November 29 (p. 114):—

Comet 1888 d (Faye).					Comet 1888 f (Barnard, Oct. 30).				
1888.	R.A.			Decl.	1888.	R.A.			Decl.
	h.	m.	s.			h.	m.	s.	
Dec. 21 ...	8	8	53	... 0° 28' 8" N.	10 26 53 ...	2	0	2	0' 2" S.
23 ...	8	7	39	... 0° 22' 7"	10 26 53 ...	1	10	0	0' 0" S.
25 ...	8	6	20	... 0° 17' 8"	10 26 45 ...	0	18	0	0' 0" S.
27 ...	8	4	54	... 0° 14' 1"	10 25 26 ...	0	35	7	0' 0" N.
29 ...	8	3	25	... 0° 11' 6"	10 26 0 ...	1	31	1	0' 0" N.
31 ...	8	1	53	... 0° 10' 3" N.	10 25 24 ...	2	28	6	0' 0" N.

The brightness of both comets remains practically unchanged from their brightness on December 19.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 DECEMBER 23-29.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on December 23

Sun rises, 8h. 7m.; souths, 11h. 59m. 36".1s.; sets, 15h. 53m.; right asc. on meridian, 18h. 9.4m.; decl. 23° 26' S. Sidereal Time at Sunset, 22h. 3m.

Moon (at Last Quarter December 26, 6h.) rises, 19h. 59m.*; souths 3h. 43m.; sets, 11h. 14m.; right asc. on meridian, 9h. 51.1m.; decl. 16° 6' N.

Planet.	Rises.		Souths.		Sets.		Right asc. and declination on meridian.	
	h.	m.	h.	m.	h.	m.	h.	m.
Mercury...	8	3	11	46	15	29	17	56.0
Venus.....	10	30	14	52	19	13	21	2.0
Mars.....	10	34	15	8	19	42	21	18.3
Jupiter....	7	13	11	10	15	7	17	19.3
Saturn.....	19	55*	3	22	10	49	9	30.6
Uranus...	1	47	7	11	12	35	13	20.3
Neptune..	13	59	21	42	5	25*	3	53.2

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Dec. 28 ... 19 ... Mercury in superior conjunction with the Sun.

Variable Stars.				
Star.	R.A.		Decl.	
	h.	m.	h.	m.
U Cephei ...	0	52.4	81	16 N.
Algol ...	3	0.9	40	31 N.
R Canis Majoris...	7	14.5	16	12 S.
and at intervals of 27 16				
S Cancri ...	8	37.6	19	26 N.
δ Libræ ...	14	55.0	8	4 S.
R Ophiuchi...	17	1.3	15	57 S.
T Vulpeculæ ...	20	46.7	27	50 N.
Y Cygni ...	20	47.6	34	14 N.
and at intervals of 36 0				
R Vulpeculæ ...	20	59.4	23	23 N.
T Capricorni ...	21	15.8	15	38 S.
δ Cephei ...	22	25.0	57	51 N.

M signifies maximum; m minimum.

Meteor-Showers.

R.A. Decl.

Near: Ursæ Majoris ... 130° ... 49° N.
,, κ Draconis ... 193 ... 68 N. ... Swift; streaks.